

VISION RESEARCH

Founded by THORNE SHIPLEY

Chairman and Editor-in-Chief

Dennis M. Levi, School of Optometry, University of California Berkeley, CA 94720-2020, U.S.A.

Vision Research Editorial Office

Vision Research Editorial Office, c/o Elsevier, 525 B Street, San Diego, CA 92101-4495, U.S.A. E-mail: VR@elsevier.com

Vision Research is a journal devoted to the functional aspects of human, vertebrate and invertebrate vision and welcomes papers that address important issues in basic and/or clinical research.

Senior Editors

WOLFGANG BAEHR, Salt Lake City, UT, U.S.A.

DAVID BURR, Pisa, Italy

MICHAEL S. LANDY, New York, NY, U.S.A.

CASPER J. ERKELENS, Utrecht, The Netherlands

DAVID H. FOSTER, Manchester, U.K.

ADAM REEVES, Boston, MA, U.S.A.

The Senior Editors are assisted by an Editorial Board consisting of:

DAVID ALAIS, Sydney, Australia

ROBERT BARLOW, Syracuse, NY, U.S.A.

GEOFFREY BOYNTON, La Jolla, CA, U.S.A.

ELI BRENNER, Amsterdam, The Netherlands

MARISA CARRASCO, New York, NY, U.S.A.

HEINER DEUBEL, München, Germany

KARL GEGENFURTNER, Giessen, Germany

MARK GEORGESON, Birmingham, U.K.

JULIE HARRIS, St. Andrews, Fife, U.K.

DONALD HOOD, New York, NY, U.S.A.

NICOLAS KATSANIS, Baltimore, MD, U.S.A.

FRED KINGDOM, Montreal, Canada

ILONA KOVACS, Budapest, Hungary

RICHARD KRAUZLIS, La Jolla, CA, U.S.A.

VICTOR LAMME, Amsterdam, The Netherlands

SUSANA MARCOS, Madrid, Spain

PAUL MARTIN, Carlton, Vic., Australia

SUZANNE P. MCKEE, San Francisco, CA, U.S.A.

SHIN'YA NISHIDA, Atsugi, Kanagawa, Japan

ANTHONY NORCIA, San Francisco, CA, U.S.A.

BRUNO OLSHAUSEN, Davis, CA, U.S.A.

MICHAEL PARADISO, Providence, RI, U.S.A.

TATANIA PASTERNAK, Rochester, NY, U.S.A.

AUSTIN ROORDA, Berkeley, CA, U.S.A.

GARY RUBIN, London, U.K.

FRANK SCHAEFFEL, Tübingen, Germany

CLIFF SCHOR, Berkeley, CA, U.S.A.

SIMON THORPE, Toulouse, France

CHRISTOPHER TYLER, San Francisco, CA, U.S.A.

JAN VAN GISBERGEN, Nijmegen, The Netherlands

PREETI VERGHESE, San Francisco, CA, U.S.A.

JOSH WALLMAN, New York, NY, U.S.A.

MIKE WEBSTER, Reno, NV, U.S.A.

TED WENSEL, Houston, TX, U.S.A.

DAVID WHITAKER, Bradford, U.K.

DAVID WHITNEY, Davis, CA, U.S.A.

HUGH WILSON, Toronto, Ontario, Canada

CONG YU, Beijing, China

Publication information: *Vision Research* (ISSN 0042-6989) is published semimonthly (except three times per month in March, June, September, and December) by Elsevier Ltd. (The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK). Further information on this journal is available from the Publisher, from the Regional Sales Office nearest you, or from this journal's website (<http://www.elsevier.com/locate/visres>). Information on other Elsevier products is available through Elsevier's website (<http://www.elsevier.com>). Periodicals postage paid at Rahway, NJ 07065-9998, USA, and at additional mailing offices. **USA POSTMASTER:** Send change of address to *Vision Research*, Elsevier, Customer Service Department, 6277 Sea Harbor Drive, Orlando, FL 32887-4800, USA.

Orders, claims, and journal inquiries: Please contact the Regional Sales Office nearest you. **Orlando:** Elsevier, Customer Service Department, 6277 Sea Harbor Drive, Orlando, FL 32887-4800, USA; phone: (877) 839 7126 [toll free within the USA]; (+1) (407) 563 6022 [outside the USA]; fax: (+1) (407) 363 1354; e-mail: JournalCustomerService-usa@elsevier.com. **Amsterdam:** Elsevier, Customer Service Department, PO Box 211, 1000 AE Amsterdam, The Netherlands; phone: (+31) (20) 4853757; fax: (+31) (20) 4853432; e-mail: JournalsCustomerServiceEMEA@elsevier.com. **Tokyo:** Elsevier, Customer Service Department, 4F Higashi-Azabu, 1-Chome Bldg., 1-9-15 Higashi-Azabu, Minato-ku, Tokyo 106-0044, Japan; phone: (+81) (3) 5561 5037; fax: (+81) (3) 5561 5047; e-mail: JournalsCustomerServiceJapan@elsevier.com. **Singapore:** Elsevier, Customer Service Department, 3 Killiney Road, #08-01 Winsland House I, Singapore 239519; phone: (+65) 63490222; fax: (+65) 67331510; e-mail: JournalsCustomerServiceAPAC@elsevier.com.

Author inquiries: For inquiries relating to the submission of articles (including electronic submission where available), please visit this journal's homepage at <http://www.elsevier.com/locate/visres>. You can track accepted articles at <http://www.elsevier.com/trackarticle> and set up e-mail alerts to inform you of when an article's status has changed. Also accessible from here is information on copyright, frequently asked questions, and more. For detailed instructions on the preparation of electronic artwork, please visit <http://www.elsevier.com/artworkinstructions>. Contact details for questions arising after acceptance of an article, especially those relating to proofs, will be provided by the publisher.

Advertising information: Advertising orders and inquiries may be sent to: James Kenney, Elsevier Ltd., 32 Jamestown Road, London NW1 7BY, UK; phone: (+44) 207 424 4216; fax: (+44) 1865 853 136; e-mail: j.kenney@elsevier.com. Customers in the USA and Canada may also contact: Tino DeCarlo, Advertising Department, Elsevier Inc., 360 Park Avenue South, New York, NY 10010-1710, USA; phone: (+1) (212) 633 3815; fax: (+1) (212) 633 3820; e-mail: t.decarlo@elsevier.com.

Printed in the United States of America

∞ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper)

Front cover illustration: Cover illustration by Para Kang.